

REMARKS

Within the present application, claims 1-10, 12, 16, and 1-32 are currently pending. Claims 1, 12, 16, 18, 19, 30 and 31 are in independent form wherein each claim recites a lead-free projectile. Additionally, the remaining claims which depend therefrom also recite a lead-free projectile.

Within the Official Action, claims 1-10, 12, 16, and 18-32 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,090,178 to *Benini*. The PTO states that *Benini* discloses a projectile comprising a mixture of metal powders wherein the mixtures comprise a first metal powder selected from the group comprising Cu, Fe, Ni, Au, AG, Pb, Cr and their alloys. Furthermore, the Examiner states that the selection of combinations from the small groups of metal listed in *Benini* as the first and second metal powders would result in densities within the claimed range of the applicant.

Applicant respectfully asserts that the cited art does not teach or suggest that which is claimed in the present application. Specifically, Applicant claims a lead-free projectile. The cited prior art, *Benini*, teaches a lead projectile. As noted by the PTO, the two Markush groups recited in *Benini* each recite lead as a possible component for the metal powders. Applicant respectfully asserts that one of ordinary skill in the art would not have selected a reference which teaches a projectile comprising lead.

Additionally, Applicant further traverses the PTO's objections in that the present application claims a lead-free projectile comprising a mixture of iron powder having a density less than lead and at least one powder selected from tin, zinc and alloys or mixtures thereof. The cited art provides a laundry list of different metals and alloys, which may include lead. The prior art fails to teach or suggest the specific selection of the claimed components of tin and zinc in a

lead-free projectile as recited in the present application. Tin and zinc are selected and claimed in the present application since both have similar densities. Similar densities reduces the probability of segregation in the final mix. A mixture, as described in the *Benini* reference, would have a greater degree of segregation. The prior art does not teach or suggest the advantages of selecting only zinc and tin.

Furthermore, the prior art is silent as to the claimed density of the iron powder. The PTO simply states that the selection of the combinations from the small group of metals listed as the first and second metal powders would result in the claimed densities of the present application. Applicant respectfully asserts that the prior art fails to recognize the significance of a density less than lead and that the prior art fails to teach or suggest a specific selection of metals which would result in the claimed density. The PTO states that a selection from the small group of metals listed in the *Benini* reference would have enabled one of ordinary skill in the art to select such metals which would have a density as claimed in the present application. Applicant respectfully notes that the *Benini* reference lists over 16 different types of metals and recites all but one of the basic metals of the periodic table from which lead is a member. Additionally, *Benini* lists metals which have a higher density than that of lead. For example, the *Benini* reference lists gold which has a density of 19380 kg/m^3 , which is much greater than the density of lead, 11340 kg/m^3 . Thus, Applicant respectfully contends that the metals listed in the *Benini* reference would not inherently have the claimed density of the present application. Furthermore, one of ordinary skill in the art would not have selected tin and zinc from the metals listed in *Benini* as claimed in the present application.

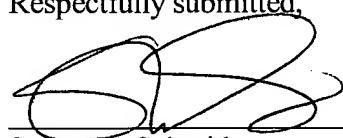
Furthermore, one of ordinary skill in the art would not have optimized the metals and densities in *Benini* to teach or suggest that which is claimed in the present application since the

prior art fails to recognize the advantages of using tin and zinc which have similar densities and which would prevent segregation of the elements in the final mix. The prior art fails to recognize the significance of having an iron powder with a density less than lead. Before a result effective variable can be said to be optimized, it first must be recognized as such in the prior art. In the cited art, the *Benini* reference is silent as to the recognition of these factors. Thus, Applicant respectfully contends that which is claimed in the present application is neither taught or suggested by the cited art.

Applicant urges that the present application is now in a condition for allowance and an early notice to such effect is earnestly solicited. However, if it is believed that any issues remain unresolved in the present application, Applicant requests that Examiner contact the undersigned.

Respectfully submitted,

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Date



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Cheryl West